OneFarm
Ko te Toi Whakahaere Pakihi Ahuwhenua
Centre of Excellence in Farm Business Management

Smaller scale New Zealand dairy farmers: long term plans and key challenges

Dr Victoria Westbrooke[1]

Dr Peter Nuthall[1]

Tom Phillips[2]

Revised 2016

[1] Lincoln University
[2] Massey University

Lincoln University
Te Whare Wānaka o Aoraki
AOTEAROA · NEW ZEALAND
New Zealand's specialist land-based university

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

Acknowledgements

The authors would like to thank the smaller farmers who participated in the survey for their time, and Katrina Knowles, DairyNZ, for collecting the written survey responses. Nicky Tarbotton and her telephone team are also acknowledged for conducting the telephone survey. They would also like to thank SMASH and DairyNZ for funding this research, with the Ministry of Primary Industries via the Primary Growth Partnership.

Disclaimer

This report was prepared solely for DairyNZ Incorporated with funding from New Zealand dairy farmers through DairyNZ and the Ministry for Primary Industries under the Primary Growth Partnership. The information contained within this report should not be taken to represent the views of DairyNZ or the Ministry for Primary Industries. While all reasonable endeavours have been made to ensure the accuracy of the investigations and the information contained in the report, OneFarm, Centre of Excellence in Farm Business Management expressly disclaims any and all liabilities contingent or otherwise to any party other than DairyNZ Incorporated or DairyNZ Limited that may arise from the use of the information.

Date submitted to DairyNZ: March, 2016

This report has been funded by New Zealand dairy farmers through DairyNZ and the Ministry for Primary Industries through the Primary Growth Partnership.

Ministry for Primary Industries
Manatū Ahu Matua

DairyNZ

Executive Summary

Farmer wellbeing has been defined as "a dynamic process that gives people a sense of how their lives are evolving" (Nimpagariste & Culver, 2010). In order to support and enhance the wellbeing of farmers in New Zealand, the farmers' goals, future plans and challenges to their plans all need to be understood. A particular group of interest is smaller scale dairy farmers. The average size of dairy farms in developed agricultural nations is increasing and New Zealand is no different. A high proportion (62%) of NZ dairy herds are smaller scale, milking less than 400 cows at peak. Their wellbeing, now and in the future, is important to the New Zealand dairy industry as a whole. Consequently, the aim of this study is to develop an understanding of smaller-scale dairy farmers' future goals, plans and challenges so that recommendations can be made to enhance and support their wellbeing in the future.

Farms who peak milked less than 400 cows were surveyed via telephone. A total of 346 surveys were completed, in Taranaki (n=103), the Waikato (n=144) and Northland (n=99). The majority of respondents' were owner-operators (75%), male (67%), born and bred in a rural area (79%), and between 40 and 60 years old (57%). Overall, the mean farm size was 97ha, with 240 cows producing 86,789kgMS with 0.83 of a full time employee. Respondents' had high (67%) equity levels in their businesses and a third (35%) had non-farming investments. Farmers' most likely future investments were related to their current farming business, that is reducing debt to very low levels and increasing production by more than 10%.

The future options of selling the farm, expanding the current farm, passing the farm onto a successor and moving to a larger farm were all very unlikely to happen on respondents' farms in the next 10 years. Most notable was the low level of succession planned with just 24% of those surveyed planning to transfer the farm to family members in the next 10 years compared to 35% in the general dairy farming population. Thus there is a high proportion of smaller-scale farmers who may value working though different strategies to meet their financial and personal objectives assuming there is no successor for their farm.

Farmers' highest ranked challenge to their future plans was 'environmental regulations and issues'. This challenge faces the New Zealand dairy industry as a whole. The potential is to find ways of tailoring the information and developing strategies that fit the situation of smaller-scale farmers. Farmers' second most highly ranked challenge was 'being able to find suitably experienced staff'. The high ranking of this challenge is understandable given the high proportion (56%) of smaller-scale farmers are planning to employ staff in the future. What is of particular interest is that there is a distinct group of farmers (23%) who do not

plan to employ staff in the future. Thus there are two distinct groups of farmers who may have different extension and farming systems needs depending on whether or not they plan to employ staff in the future.

The third and fourth ranked challenges related to capital/debt required for future plans and cash-flow. On average, smaller farmers have high equity (67%) in their businesses, and farmers noted that one of their key future strategies is to repay debt. It is critical to explore the debt/capital and cash-flow aspects of any future farming options/systems for smaller scale dairy farmers.

In terms of extension methods, farmers had a strong preference for single events, in a range of formats compared to meeting with a group on a regular basis. The single events could have a range of formats, for example they could involve expert speakers, workshops, discussion with other farmers or farmer case studies. The farmers' comments were strongly supportive of the events and topics that SMASH currently organise.

Based on farmers future plans and challenges reported and discussed in this study, it is clear the smaller scale dairy farmers would like knowledge and assistance in five key areas; succession, regulation and compliance, staff, technology and cash-flow/profitability. This report concludes with suggestions for each of these areas, which has the potential to maintain or increase the wellbeing of smaller scale dairy farmers in New Zealand.

Contents

1.0 Introduction

Recently, dairy farmers have been found to have high levels of distress and burnout, depending on how this is measured, higher than the levels in the general population (Botha & White, 2013). Currently, there is a 'Dairy Farmer Wellness and Wellbeing Programme', funded by DairyNZ and the Ministry for Primary Industries, underway in New Zealand. The term 'wellbeing' in this programme relates to farmers physical and emotional state, including stress and fatigue. Building on the emotional aspects, wellbeing has been defined as "a dynamic process that gives people a sense of how their lives are evolving" (Nimpagariste & Culver, 2010).

Due to current concerns around farmers' wellbeing, the objectives of this project were to investigate the wellbeing of smaller scale dairy farmers to provide suggestions as to how wellbeing could be maintained or improved in the future. This research will not investigate the psychological aspects of wellbeing, rather it will work on the premise of assisting farmers to reach their goals will enhance their future wellbeing. Thus the research objective was met by investigating farmers' longer term plans, challenges to these plans as seen by the farmers, farmers managerial style and the farmers' preferred methods of receiving knowledge and support. The research was conducted in Taranaki, Waikato and Northland to identify any differences between regions with a high proportion of smaller scale dairy farmers. The following section, 'background' will focus on the definition of a smaller scale farm, followed by a discussion of the issues facing smaller scale farmers, goals and their influence on farmer wellbeing, and farmers managerial style.

1.1 Background to smaller dairy farms

Globally, the average farm size is increasing, (see for example Burton and Walford (2005) for the UK and Santelmann et al. (2004) for the USA). Farm scale has been found to play a critical role in decision making on farms (Defrancesco, Gatto, Runge, & Trestini, 2008). Recently, there has been a focus on the problems of smaller scale dairy farms, especially in the UK (McNally, 2001), Europe (Breustedt & Glauben, 2007) and in the US (Summer & Wolf, 2002).

The definition of a small farm varies, and has changed over time. The focus is on farmers who receive the majority of their income from farming (Hansson, Ferguson, & Olofsson, 2012), that is commercial farmers. The actual area or cow numbers that farmers have to have to qualify as small has increased over time. In New Zealand, farms less than 40 hectares were considered small (Allen, 1998), and Parker (2000), defined a small farm (NZ) as one being less than 60 hectares supporting fewer than 180 cows. Whereas in 2013, less than 250 cows was used as the definition by Westbrooke (2013b). Currently, Smaller Milk and Supply Herds

(SMASH), do not set an area or number of cows farmed requirement to be a member of their organisation, rather they welcome farmers that identify with the issues of smaller farmers. Thus with this definition, it is farmers self-identification, rather than the number of cows or area farmed, that denotes the farmer as smaller scale.

Historically, small dairy farms have achieved higher profitability per hectare than the NZ average, but the number of hectares farmed has limited the level of total profit (Allen, 1998). Dairy farming systems in NZ have become more intensive in recent decades (Greig, 2012), echoing trends overseas. Thus the machinery and infrastructure required to manage farms has become larger and more expensive (Lambert, Sullivan, Claassen, & Foreman, 2007). This is one of the economic dilemmas for owners of smaller dairy farms. A large capital investment spread over fewer kilograms of milk solids produced results in higher fixed costs per kilogram of milk solids relative to larger farms. Once these high fixed costs from capital investment, have been incurred they are generally medium to longer term, and are difficult to change or reduce, should, for example the pay-out decrease.

One way to make capital investment profitable is to increase production with, for example, purchasing additional land, increasing supplementary feeding, or by lower inputs and decreased costs. Often behind the production increase is a major change in farming system. The more intense farming systems are known to be more challenging to manage and there is no guarantee that they will be profitable (Shadbolt, 2012), and are vulnerable to a declining milk solids payout. Clearly, capital investment, if it leads to increased production, can lead to reduced fixed costs per unit of production and possible profit, but this involves risk and requires a farm manager keen and able to implement and manage the new system.

The other option for owners of small farms is to follow a pasture-based, low input farming system and reduce the need for capital investment in infrastructure. This pasture-based system has been the cornerstone of New Zealand's traditional low, or cost minimisation approach (Shadbolt, 2012). Westbrooke (2013a) found many small herd owners preferred this farming system, due to the lower capital requirement for infrastructure and its simplicity. Low input pasture systems can also be extended to once-a-day milking, which has the major benefit of substantially reducing the workload. Small farmers also believed that a low-input pasture system could survive low pay-outs, such as in the 1980's, which many interviewees recalled (Westbrooke, 2013a).

Given these two very broad strategic directions, previous researchers have investigated what smaller farmers thought that they would likely to be doing in the future. In the 1990's, smaller farmers felt that they would not be dairy farming in a decade, that they would be either retired, or on their current farm, but not

dairy farming. They felt that there was some likelihood of being on a larger farm, but a low chance that they would employ a manager or sharemilker (Parker, Rauniyar, & Dooley, 2000). What stood out from these results, was the farmers very high satisfaction with their current farm's location, and hence their reluctance to sell and purchase a larger farm where land was cheaper (Parker et al., 2000). More recently, a key challenge for many Waikato farmers who relocated to larger farms in the South Island, was moving away from friends and family (Pangborn, 2012).

Only 34% of farmers in the 1990 survey were happy, or very happy, with their farm size versus 48% who were dissatisfied or very dissatisfied (Parker et al., 2000). Given farmers' satisfaction with their current location, expansion at the current location was the farmers most preferred option. However, just under half (48%) believed that there was suitable land available locally for expansion, and only 40% of farmers agreed that land prices in the location were affordable. This leads back to the question of capital investment, and how to make this investment profitable and able to fund farmer's future goals and objectives.

Recently, there has been a focus on succession and its importance to agricultural businesses (Dooley & McLeod, 2012). It has been described as one of the key drivers in family farming and has been associated with strategic business decisions (Potter & Lobley, 1996). The importance of succession in farm decision making is reinforced by owners of smaller farms in the Waikato stating that they would adopt major changes to their farming systems, but only if this allowed the farm to be transferred to the next generation (Westbrooke, 2013). A move to intensification, a strategic decision, has been noted where farmers are preparing for a successor, or one has recently taken over, whereas extensification has been considered where there is no successor (Potter & Lobley, 1996).

In New Zealand, Parker et al. (2000) found that low proportion (24%) of small scale farm owners expected their children to continue dairying on the home farm in the 1990's. A later study found a slightly higher proportion of farmers (30%), in general intended to pass on their farm to heirs before they retired (Nuthall & Old, 2014). For succession to occur there has to be children seriously interested in taking over the farm. For farming business in general, 39% indicated that at that stage they had no children with a 'serious' interest in farming (Nuthall & Old, 2014). Thus if this argument is continued, approximately 60% of farm owners did not have children seriously interested in running the home farm, thus were not expecting succession to occur. This leaves a majority of farmers deciding how to 'wind down' or sell and exit the industry.

Dairy farmers tended to be younger than farmers in general (a higher proportion in the 46-55, than the 56-65 year age bracket) (Nuthall & Old, 2014). However,

the mean age of smaller herd owners (51 years) in 1990, was older than that of the general herd owning population. While 75% of small herd owners were over 45 years, there was a proportion of young farmers who had purchased their farm, in the last 5 years (Parker et al., 2000). With the majority of smaller dairy farmers being in an older age bracket they may have already considered the most likely outcome with regards to succession. However, small farm owners in the younger age bracket grouping may have children too young to have a 'serious interest' in farming at this stage.

Thus there is a picture of increasing dairy farm size, the challenges of capital investment, farming system to run, successors, against smaller scale farmers satisfaction with their location, with the local community, friends and family. Yet there needs to be a way of investigating ways of enhancing wellbeing in the future for smaller scale dairy farmers.

Farmer wellbeing has been the subject of recent research and the focus of extension programs in New Zealand (Botha & White, 2013). Farmer stressors has been divided into four categories of farming, financial, relationship and health and workload (Botha & White, 2013). By reducing stressors in these categories it could be argued that wellbeing is being enhanced. Botha and White (2013), provide recommendations for enhancing dairy farmers wellbeing, however designing extension programs focused on the longer term to enhance future farmer wellbeing is difficult. Earlier research in the 1980's found that the level of family farm income, a farmers' commitment to farming and recognition of economic constraints to farming could influence farmer wellbeing in the future. Overall, however, the authors' emphasised that attitudinal and personal characteristics were more useful in indicating future wellbeing that income and economic factors (Molnar, 1985). In terms of enhancing future wellbeing, there is a wealth of psychology literature linking goal attainment and wellbeing (see for example the reviews by (Diener, Oishi, & Lucas, 2003; Ryan & Deci, 2001)). A detailed discussion of this research is outside the scope of this project. However this research is based on the premise that farmers achieving a range of goals and farm plans which are important to them will lead to enhanced future wellbeing. Thus farmers' future plans in a number of business areas, and farmers' managerial style and locus of control is investigated in this project.

Farmers' goals and objectives are a key driver in their future farming and business plans. Recent work has found that both highly and lowly ranked goals were the same for both dairy farmers and farmers in general (Nuthall & Old, 2014). The same study found that small dairy farmers ranked 'expanding the size of the business' is very important' and 'passing the property to the family is very important' very highly, as well as noting that 'showing a presence in the community' and 'earning the respect of others' were also important. The very

important ranking of 'passing the property to the family', appears to conflict with only 24% of small farm owners intending to pass on their farm. This could be farmers' goals, or their hopes not aligning with what they believe is realistic, i.e. actually passing the farm onto the next generation. Also of interest was that they ranked 'lowering pollution' lowest of the list of possible objectives. With regards to succession, Westbrooke (2013a) found a mixed response when famers were asked about handing the farm onto the next generation. Some farmers had built equity to purchase the farm at market rates themselves and wanted their children to do the same. Others wanted their children 'to make their own way', while others wanted to assist their children with the use of assets. Few farmers appeared to want to pass on the farm in its current state.

Farmers' investment strategies and the challenges to these determine what level of farmers' goals and objectives can be achieved. In the 1990's, small farmers preferred future investments were 'debt repayment', 'farm development' and 'improvements to the family home'. The less preferred investments were 'investing in the children's education', 'purchasing farm equipment or machinery', with 'off-farm investment' somewhere in the middle (Parker et al., 2000). However, small farm owners were more interested in selling the farm and investing off-farm than either dairy farmers or farmers in general (Nuthall & Old, 2014). Recently, Westbrooke (2013b) found that debt repayment was still the preferred investment, with farmers believing that with very low debt and very low expenses, they could employ a farm worker in the future when they could no longer milk.

This brings to the fore smaller farmers' ideas 15 years ago, on the barriers to increasing their farming income, as reported by Parker et al. (2000). Two of the barriers, 'unfavourable actions of the dairy industry' and the 'economic and political environment' were outside the farmers' control. The third key barrier was 'lack of capital' presumably to buy the local land that was very expensive. Farmers felt that 'human factors' were not barriers at all. These included 'what others think of the plan', 'the lack of learning opportunities', and 'farmer attitude and ability to change' (Parker et al., 2000). In the same study, two medium rated barriers to increasing farm income were 'environmental regulations' and 'lack of suitable cost effective technology'.

It is also important to recognise that a farmer's managerial style is related to their personality and determines many components of how a farmer operates. Furthermore, a farmer's managerial skill is also related to their management style, intelligence and training (Nuthall, 2006). Accordingly, a knowledge of a farmer's style helps understand their views about the future and the associated training requirements. Information gained from the survey enables understanding the types of farmers requesting the various extension information and systems. This

in turn helps in developing a suitable extension system. Managerial style and intelligence are strongly related to farmer's beliefs in their ability to control their outcomes, and in their learning styles.

A knowledge of farmer's goals and aims helps in deciding the content of any extension programme as if, for example, they are particularly interested in reducing pollution and enhancing the environment this clearly directs information provision in this area. Of course, regulations might also suggest the content of short courses and the like. As another example, if time for leisure is highly ranked, then ways of obtaining leisure time without a major time cost would be of interest. Farmers are known to prefer to learn from first-hand experience, enjoy engaging the social aspects of education, however there are differences between farmer groups in how they prefer to learn (Franz, Piercy, Donaldson, & Richard, 2010). Traditionally the New Zealand dairy industry has had an extension system where groups of dairy farmers' come together on a regular basis to provide support and focus on improving members dairy farming businesses (Sankey, 2015). Yet there are a range of different learning approaches or extension methods used in New Zealand agriculture (Sankey, 2015; Sewell et al., 2014), thus it is important to investigate the preferences of particular groups of farmers to tailor the delivery of knowledge and information to them.

In summary, the major aim of this research was to investigate the longer term plans, goals and objectives of small herd owners in New Zealand, especially with regards to succession. Understanding survey responses can provide the issues farmers' believe are challenges to their longer term plans, and how they would like knowledge and support provided. This information, together with the literature, will help with the design of future extension programs and resources to improve small farmer wellbeing.

2.0 Materials and Methods

A telephone survey to investigate the future steps for small herd owners was conducted between the 15th of October and the 21st of November 2014. A copy of the survey is in Appendix A.

The survey was compiled in conjunction with SMASH to cover five key areas:

- Farm and family statistics, including farmers managerial style, goals and aims, and locus of control,
- Future farming plans of the farm owner(s),
- Resources available, and challenges to the farmers plans,
- Farmers' preferences in terms of how they would like to see knowledge and support provided.

Questions relating to farmers' managerial style, aims and goals and locus of control, as shown in Table 1, were selected from the National Survey on Farm Succession and Governance (Nuthall & Old, 2014). This was to allow comparisons of results from this research with recent findings for New Zealand farmers.

Table 1 Questions in the current survey taken from the National survey on succession and governance (Nuthall & Old 2014.) (Each question was rated on a 1(not true) to 5(true) scale)

Managerial style
You tend to tolerate mistakes and accidents that occur with employees and/or contractors
You sometimes don't sleep at night worrying about decisions made.
You find investigating new farming methods exhilarating and challenging
You normally don't rest until the job is fully completed
You speak your mind and ask questions at farmer meetings.
Goals and Aims
It is very important to pass on the property to family members
It is essential to plan for reasonable holidays and leisure time
Aiming for maximum sustainable net cash returns is very important
Locus of control
When things go wrong it is often due to events beyond my control, e.g. weather, product prices

2.1 The questionnaire

The questions were either short answer replies or statements which the respondent was asked to rate the degree of truth of the statement for their situation. A Likert style 1 (not true) to 5 (true) scale with word anchors at each end was used based for the farmer's scale rating preferences. The questionnaire was designed to take between 12- 14 minutes. It was trialled with both colleagues and farmers (n=13) and refinements were made based on their feedback. The questionnaire was also adapted for farmers to complete at field days. To encourage participation, and respect the time farmers spent answering the questionnaire, participating farmers were entered into a draw for three $200 Farmers gift cards. The survey was conducted by a trained telephone team, experienced in working within the agricultural sector. The questionnaire was approved by the Lincoln University Human Ethics committee, approval Number 2014-33.

2.2 Sample and regions targeted

The basic sample was taken from a randomised selection of farmers from the SMASH membership database together with additional respondents randomly selected from electoral rolls of the selected areas. The number of these additional respondents was based on the short fall in each area after the SMASH list was exhausted. The SMASH database contained names and phone numbers, the electoral rolls contained names and occupation requiring the phone numbers to be found from the 'white pages'. During the survey period a SMASH field day was conducted in Taranaki so the opportunity was used to obtain further written responses (n=21). The telephone operators entered the data onto the survey form and the data was subsequently entered into the spreadsheet by the survey team manager. The written responses from the field day were entered into the spreadsheet by a trained post-graduate student.

An analysis of farm sizes countrywide made it clear most small dairy farmers were located in Northland, Waikato, and Taranaki. Consequently these areas were targeted to obtain the sample. The telephone interviewer asked to speak to the farm owner/decision maker.

Initially, the aim was to interview farmers from the SMASH membership database, however on inspection of the database so farmers were milking more cows than expected, so an arbitrary maximum of 385 cows was used as a survey cut off. However the response rate early in the survey was low so the cut-off was lifted to 400 cows. Farmers milking more than 400 cows in 2013 were not interviewed, in general, other than being thanked for their interest. In the case of share milkers, only 50:50 share milkers were included.

2.3 Data analysis

The data from the spreadsheet was imported into SPSS (Statistical Programme for Social Science, IBM; version 22) for analysis. This package allows most of the statistical operations, table building, and distribution calculations required. The results are presented in the following section. It will be noted differences between the regions have been highlighted and statistically compared using the Student's t test and F statistic tests in ANOVA tables.

3.0 Results

This section starts by outlining the survey response rate, then describes the participating farming businesses. The focus then moves to the farmers, their gender, educational details and demographic data followed by their goals and managerial style.

The results then turn to one of the key questions in this research, farmers' future 10 year plans, followed by farmers rating of the potential challenges to their plans. The final section of the results section focuses on how smaller scale farmers' would like knowledge and information provided, that is their extensions preferences.

3.1 Response rate

A total of 346 surveys were completed. The target of 100 completed surveys was successfully reached for Taranaki (n=103) and Waikato (n=144), with Northland almost reaching this target (n=99), as shown in Table 2. The telephone response rate varied from 51% in Taranaki, which was supplemented by 21 surveys completed at a field day, to 44% and 30% in the Waikato and Northland, respectively.

Table 2: Number of completed surveys by region, and collection method.

Region	Telephone			Written	Total surveys completed
	Farmers Telephoned	Number Completed	Response rate (%)		
Taranaki	160	82	51	21	103
Waikato	474	144	30	0	144
Northland	224	99	44	0	99
Total		**325**		**21**	**346**

3.2 Farm and business data

Farm and business data reported in this section aims to provide a context for the main research questions posed, namely smaller scale farmers' long terms plans and challenges to these. As such this section reports on farm production and staff employed on respondents farms, for each of the regions surveyed. The business data provided describes farm ownership, investments and farmers equity in their farming businesses, again for each of the three regions surveyed.

3.2.1 Farm data

The surveyed farmers milked on average 240 cows at peak, on 97ha employing nearly a fulltime staff member in addition to the manager, as shown in Table 3. Over all regions, the mean total milk solids production level was 86,789 kg MS, 355 kg MS/cow and 971 kg MS/ha.

Table 3: Data for the farms surveyed in the three regions.

	Overall mean	F Sig pr	Taranaki	Waikato	Northland
Peak cows milked (cows)	240	0.335	242	233	249
Effective farm area (ha)	97	0.000	931	842	121[1,2]
Production (total kgMS)	86,789	0.005	94,457[a]	86,306	79,363[a]
Production (kgMS/cow)	355	0.000	377[a]	365[b]	316[ab]
Production (kgMS/ha)	971	0.000	1070[a]	1080[b]	696[ab]
Staff employed (FTE)	0.83	0.073	0.75	0.77	0.99

Regional means within rows with different subscripts (letters) are different ($P < .001$), with different subscripts (numbers) are different ($P < .05$).

In terms of herd size, the majority (60%) of farmers milked between 151 and 300 cows at peak. Few farmers (10.5%) milked relatively large herds of more than 350 cows and very few (2.6%) milked relatively small scale herds of less than 100 cows, as show in Table 4.

Table 4 Distribution of respondents' herd size, over all regions

	Number of cows milked at peak							
	0-50	**51-100**	**105-150**	**151-200**	**201-250**	**251-300**	**301-350**	**351-400**
Farmers (%)	<1	2	11	24	21	13	18	11

A key point within the employment data is that approximately two thirds (66%) of the smaller farmers surveyed employed one or more staff members, as shown in Table 5. The majority of farmers (46%) employed one full time staff member, with a few (2%) of farmers employed two or more employees. In all regions, approximately 30% of smaller farmers employed no staff. While borderline in terms of significance, as show in Table 3, it was notable that farmers in Northland had employed a higher proportion of a staff member (0.99FTE), compared to farmers in the Waikato (0.77FTE) or Taranaki (0.75 FTE). The distribution of employment on farms is of particular interest. In the Waikato and Taranaki, roughly 50% of farmers employed one FTE, however in Northland only a third of farmers did. When considering farmers employing two staff members the trend is reversed. In Northland 23% of farmers employed two staff members, whereas in Taranaki and the Waikato 8-10% of farmers did, as shown in Table 5.

Table 5 Distribution of number of staff (FTE) employed on respondents' farm. Row percentages

	Number of staff (FTE) employed						
	0	**0.5**	**1**	**1.5**	**2**	**2.5**	**3+**
Overall	33.9	3.5	45.5	2.0	13.0	0.6	1.5
Northland	32.3	4.0	32.3	4.0	23.2	1.0	3.0
Waikato	34.0	2.1	52.1	1.4	9.7	0	0.7
Taranaki	35.3	4.9	49.0	1.0	7.8	1.0	1.0

There were significant variation between farms in the three regions, with regards to farm size and milk production levels. The effective area farmed by Northland respondents was significantly larger (121ha) compared to farmers in the Waikato (84ha) and Taranaki (93ha). However, Northland farms produced significantly less milk on both a per cow and per hectare basis than farms in the Waikato and Taranaki, as shown in Table 3. As already noted, farms in Northland were significantly larger and ran slightly more cows than in the other regions, however this was not sufficient make up for the lower production per cow and per hectare. Total production in Northland (79,363kgMS) was significantly lower than the Waikato (86,306kgMS) and Taranaki (94,457kgMS).

3.2.2 Farm business data

A summary of the business data collected from farmers surveyed is given in Table 6. The majority of respondents' (75%) were owner operators, followed by a quarter who were 50/50 share-milkers. Very few farmers were in equity partnerships or were on leasehold land. Interestingly, a third of farmers (35%) had non-farming investments. This was consistent across all regions, with 36%, 35% and 33% of farmers in Taranaki, Waikato and Northland, respectively having non-farming investments. Just under a quarter of farmers (23%), had a financial interest in a farming business other than their home farm.

Table 6: Financial data collected on farms surveyed in each of the three regions.

	Overall Mean	F Sig prob	Taranaki	Waikato	Northland
Farm owners (%)	74.5	0.628	71.6	72.9	76.8
Share-milkers (%)	23.2		23.5	24.3	20.2
Leasehold (%)	1.5		0.0	2.8	1.0
Equity partner (%)	0.9		1.0	0.0	2.0
Farmers with non-farming investments (%)	35	0.917	36	35	33
Farmers' with financial interests farming businesses as well as the home farm (%)	23	0.003	28^{1}	$14^{1,a}$	31^{a}
Farmers % of equity in their farming business	67	0.662	67	68	66

Regional means within rows with different subscripts (letters) are different ($P < .001$), with different subscripts (numbers) are different ($P < .05$).

Over all regions, farmers' had a moderate to high (67%) mean level of equity in their businesses. Table 7 provides a breakdown of the figures across levels reinforcing the strong equity position of small dairy farmers. A third of respondents' had very strong (80% or more) equity in their businesses, at the other 'risky' end of the equity scale, a low percentage of farmers (17%) had less than 40% equity in their businesses.

Table 7: Percentage of farmers with different equity levels in their business

	Equity level (%)				
	<20	20-40	40-60	60-80	80-100
Farmers (%)	6	11	28	25	30

In terms of the business data collected, there was only one area where there was a significant difference between the regions. In the Waikato just 14% of respondents had investments in other farms, whereas in Northland and Taranaki the levels were significantly higher at 31% and 27% of farmers respectively (as shown in Table 6).

3.3 Farmer data

The farmer data reported in this section, like the farm and business data reported in section 3.2, aims to provide context and background to the key questions in this research, farmer's long term plans and challenges. Firstly the respondent's age, gender, education and place of upbringing is reported. The farmers ranking of three key goals, followed by their managerial style is then described.

Background data, gender, 'place of upbringing', age and highest level of education obtained was collected from each participating farmer at the start of the survey. The majority of smaller herd owners responding to the survey were male (67%) and overwhelmingly 'born and bred' in a rural area (79%), as shown in Table 8.

Table 8: Gender and place of 'upbringing' of survey respondents in the three regions

	Overall mean	F Sig prob	Taranaki	Waikato	Northland
Male (%)	67	0.626	65	70	65
Female (%)	33		35	30	35
Farmers born and bred in a rural area (%)	79	0.187	85	76	77

There was a fairly even spread of ages of respondents from 30 through to 60 plus years as shown in Table 9. The majority of farmers (57%) were between 40 and 60 years old. A similar proportion of farmers were in the 20-40 age bracket (24%) and 60+ age bracket (19%). A very low proportion, less than 5%, of respondents were under 30 years old.

Table 9: Percentage of survey respondents in each age bracket.

	Age range (years)				
	20-30	30-40	40-50	50-60	60+
Farmers (%)	4	20	30	27	19

In terms of education, the highest level of achieved by the majority (43%) of farmers was secondary, as shown in Table 10. Just over 40% of farmers had a tertiary qualification, either a diploma (19%) or a degree (22%). Very few (0.3%) farmers had not completed secondary education. There was no significant difference between the regions in terms of respondent's gender, where farmers were 'born and bred', age or highest level of education attained.

Table 10 Percentage of farmers' surveyed attaining each level of education

	Highest level of education attained					
	Pre-secondary	Secondary	Farm cadet	Diploma	Degree	Other
Farmers (%)	<1	43	12	19	22	4

3.3.1 Farmers' goals

Farmers strongly to moderately agreed with the goals of 'aiming for maximum net cash returns is very important' and 'it is essential to plan for reasonable holidays and leisure time', however they were neutral over the goal 'it is very important to pass on the property to family members', as show in Table 11.

The most highly ranked goal by farmers, was 'aiming for maximum net cash returns is very important', with a mean ranking of 4.46 (on a 1 to 5 scale), as shown in Table 11. The importance of this goal is reinforced by the 62% of respondents' who rated this goal as a 5 (strongly agree), whereas a very low (3%)

of farmers rated this goal a 1 or 2, moderately or strongly disagreeing with the statement.

Farmers 'moderately agreed' with the goal of 'it is essential to plan for reasonable holidays and time off'. There was a similar trend in responses to the first most highly rated goal, with a high (55%) of farmers rating the statement a 5 (strongly agree). However, there was a higher proportion (8%) of farmers disagreeing with the statement, by rating it as a one or two.

Table 11 Percentage of farmers' ranking of the importance of each goal, from 1 strongly disagree to 5 strongly agree

	Overall mean	**Sd***	**Sig+**	**Rating**				
				1 *S disagree*	**2**	**3** *Neutral*	**4**	**5** *S agree*
Aiming for maximum sustainable net cash returns is very important	4.46	0.80	0.704	0.3	2.9	9.3	25.6	61.9
It is essential to plan for reasonable holidays and leisure time	4.23	1.03	0.591	3.2	4.7	10.8	26.8	54.5
It is very important to pass on the property to family members	2.93	1.39	0.858	22.4	14.2	30.2	14.2	18.9

* Standard deviation; + F significance probability across regions, Waikato, Taranaki and Northland

Farmers were neutral when it came to the 'importance of passing the property to family members', with a mean overall rating of 2.93. There was a relatively even spread of ratings, for the statement, with a high (30%) proportion of farmers rating this issue as neutral, i.e. a 3, and a similar percentage of farmers strongly disagreeing with the statement (22%) and strongly agreeing with the statement (19%). There was no significant difference in how the farmers from different regions rated the goals, as shown in Table 11.

3.3.2 Farmers' managerial style

A limited set of questions designed to explore farmers' loci of control, attitudes and actions was included in the survey. The overall mean scores, statistics and ratings are shown in Table 12. Overall, farmers have ranked the statements a) to f) between neutral to moderate agreement (2-4), showing some excitement and actions.

Statement a) 'when things go wrong it is often due to events beyond my control' is exploring farmers' beliefs around the locus of control. Farmers moderately agreed with the statement, with 60% of farmers rating this a 4, moderately agree

or 5, strongly agree, thus surveyed farmers believed events were often out of their control.

Statements b) to e) investigated various aspects of farmers' management, from investigating new farming methods to asking questions at farmer meetings and tolerance of mistakes from others. Again farmers were in moderate agreement with the statements. Farmers ranked investigating new farming methods and questioning at farmer meetings ahead of tolerating the mistake of others. However, even this last statement was rated as neutral, with 70% of respondents' rating this statement neutral 3, or moderately agreed 4.

The final question, f) relates to worry, and overall, farmers noted that, in general they do sleep at night and they don't worry about decisions made. The interpretation of the result for this question is a little more difficult due to how it has been written as a negative 'you sometimes don't sleep at night', farmers are actually saying that they moderately disagree (2.07) that they don't sleep at night worrying about decisions made.

Table 12: Farmers level of agreement with statements relating to managerial style, where 1 is strongly disagree to 5 strongly agree.

	Overall	**Sd***	**Sig+**	**Rating**				
				1 *S disagree*	**2**	**3** *Neutral*	**4**	**5** *S agree*
a) When things go wrong it is often due to events beyond my control	3.80	1.06	0.145	2.3	8.4	29.1	26.7	32.6
b) Investigating new farming methods is exhilarating and challenging	3.73	1.09	0.785	5.2	6.7	25.6	35.2	27.3
c) You speak your mind and ask questions at farmer meetings.	3.60	1.29	0.617	9.2	11.5	21.0	26.9	31.3
d) You normally don't rest until the job is fully completed	3.44	1.26	0.004	7.9	16.3	25.9	23.6	26.2
e) You tend to tolerate mistakes and accidents that occur with employees and/or contractors	3.30	1.06	0.681	7.9	10.6	36.4	33.9	11.2
f) You sometimes don't sleep at night worrying about decisions made.	2.06	1.24	0.000	44.9	25.4	14.6	8.7	6.4

* Standard deviation + F significance probabilities across regions

There is agreement between farmers in the three regions on all but two of the statements, statement d) and f), as shown in Table 12. Farmers in Northland moderately agreed (3.74) with the statement 'You normally don't rest until the

job is fully completed', this was significantly higher than farmers in Taranaki (3.16) who were neutral, as shown in Table 13. Thus farmers in Northland are significantly more likely not to rest until a job is completed than farmers in Taranaki. Also note question 'a' is approaching traditional significance levels. That is, there is a probability that differences exist of 85.5% meaning the farmers have a different belief in their control level.

Table 13 Significant regional differences regarding worrying about decisions made and completion of jobs, where 1 is strongly disagree to 5 strongly agree.

	Overall mean	Taranaki	Waikato	Northland
d) You normally don't rest until the job is fully completed	3.44	3.16[a]	3.44	3.74[a]
f) You sometimes don't sleep at night worrying about decisions made.	2.06	1.87[a]	1.85[b]	2.57[ab]

Regional means within rows with different subscripts (letters) are different ($P < .001$).

Farmers in the Waikato and Taranaki moderately disagreed (1.8) with the statement 'You sometimes don't sleep at night worrying about decisions made', whereas farmers in Northland were significantly weaker (2.57) in their disagreement with the statement, as shown in Table 13. Thus farmers in Northland appear to worry more about decisions made than their counterparts in Taranaki and the Waikato.

3.4 Farmers' future plans

Farmers' future farming plans are broken down to and reported for three areas. The first area covered is farmers most likely future farm ownership option, followed by who or how will the farm work be done, and lastly farmers most likely future investment or sources of income. Differences between regions, where they occur, are highlighted.

3.4.1 Farm ownership

All of the future farming options suggested to farmers, as shown in Table 14, were very unpopular. All of the options were rated as moderately (2) to very unlikely (1) to occur in the farmers business in the next ten years. This unpopularity was reinforced by the very high proportion (approximately 40%) of farmers rating the options as 1 or very unlikely.

Of all of the options, not continuing with the dairy farming business was a future possibility for a third of farmers. These were the farmers who rated selling their farm as moderately (4) or very (5) likely in the future. For the remaining options, either increasing the farm size or transferring the farm to family, less than a quarter of respondents' rated these as possibilities for the future, that is rated the options as a 4 or 5.

The option of 'selling the current farm to move to a larger property' stood out for its overwhelming unpopularity, just 14% of farmers considered this option moderately (4) or very (5) likely in the next ten years. Interestingly, there was no significance difference between the regions in farmers' ratings of the future farm ownership plans.

Table 14: Percentage of farmers' rating each future ownership option, where 1 is very unlikely, 5 is very likely.

	Overall mean	Sd*	Sig+	Rating				
				1 *Very unlikely*	**2**	**3** *Neutral*	**4**	**5** *Very likely*
Sell farm	2.52	1.54	0.101	41.5	11.3	18.9	10.6	17.7
Increase farm size	2.40	1.41	0.686	40.4	14.7	21.1	12.5	11.3
Transfer farm; 1 + children	2.33	1.47	0.525	45.9	12.4	17.3	11.7	12.8
Sell farm; move to larger farm	1.80	1.26	0.108	64.2	12.1	9.8	7.5	6.4

* Standard deviation + F significance probability across regions (note that 'sell farm' and 'sell and move to larger farm' are approaching full significance

3.4.2. Who/how will the farm work be done in the future?

Farmers were asked to rate the likelihood of who or how the farm work would be done in the next ten years. Overall farmers were close to neutral regarding all the options, as shown in Table 15. Farmers' most favoured option for the farm work in the future was to employ a non-family worker. However, the mean rating for this option was just over neutral at 3.42. What is interesting about this data is the strong support for either employing, or not employing, a worker depending on the farm. Just under 40% of the farmers surveyed rated this option as a 5 or very likely, while at the other end of the scale 23% of farmers rated it as 1 or very unlikely. That is, 60% of farmers have a strong view on whether employees/contractors will be undertaking the farm work on their properties in the future.

'Investing in on-farm technology' and farmers 'doing the majority of the work themselves' were rated similarly. Both of these options had a much lower percentage (<20%) of farmers rating the option as a 5, or very likely, and thus each option did not have a sizeable group of farmers showing strong support for that particular option. This is in contrast to the case for employing an employee/contractor option. However, 'Investing in on-farm technology' in the future to do the farm work was notable for the relatively even spread of ratings from very unlikely to very likely, as shown in Table 15.

Table 15: Percentage of farmers rating for each option as to who will do the farm work in the future, 1 is very unlikely to 5 very likely.

	Overall mean	Sd*	Sig+	Rating				
				1 *Very unlikely*	2	3 *Neutral*	4	5 *Very likely*
Employ a non-family worker	3.42	1.59	0.296	23.1	5.7	15.9	16.5	38.7
Investing in on-farm technology	2.80	1.40	0.713	26.7	16.0	22.1	21.1	14.0
Doing the majority of the work themselves	2.79	1.43	0.057	28.1	14.0	26.0	14.9	17.0

* Standard deviation + F significant probability across regions

The option of 'farmers doing the majority of work themselves' had a notable difference between farmers' in the different regions. As shown in Table 16, approximately a third of farmers in the Waikato and Northland rated 'doing the majority of the work themselves' as a 1 or very unlikely, whereas in Taranaki only 17% of farmers rated this option as a 1 or very unlikely. Thus more farmers in Taranaki are likely to do the work on the farm themselves in the future.

Table 16 The percentage of farmers in different regions rating of the likelihood of farmers doing the majority of farm work themselves in the future, 1 very unlikely to 5 very likely.

	Rating				
	1 *Very unlikely*	2	3 *Neutral*	4	5 *Very likely*
Northland	32.3	15.2	22.2	13.1	17.2
Waikato	32.1	14.3	24.3	13.6	15.7
Taranaki	17.7	12.5	32.3	18.8	18.8

3.4.3 Future investments and sources of income

Following on from questions about who or how the farm work would be done in the future on smaller farms, respondents were asked their views on future income and investment strategies. Specifically farmers were asked to rate the likelihood of the investment/income options, shown in Table 17, occurring in their businesses in the next ten years.

Farmers' most likely future investments and income fell into three main groups, as shown in Table 17. The first group were the two traditional options. They were to 'reduce the farm debt to very low levels' and 'increasing production by more than 10%' with mean overall ratings of 3.77 and 3.60 respectively. The popularity of these two traditional strategies is emphasised by a very high proportion, approximately 60%, of farmers who rated them as moderately (4) or very likely (5) to occur on their farms in the future.

Farmers were neutral (mean overall rating of 2.79) about the next most likely future investment/income strategy of 'investing in another farming business, as well as the current farm'. Apart from the third of farmers who rated this option as very unlikely, the responses were evenly spread over the remaining ratings, as shown in Table 17.

Table 17 Percentage of farmers' rating of future investment and income strategies, 1 is very unlikely to 5 is very likely.

	Overall mean	Sd*	Sig+	Rating				
				1 *Very unlikely*	2	3 *Neutral*	4	5 *Very likely*
Reducing farm debt to very low levels	3.77	1.31	0.102	9.9	7.3	17.7	25.9	39.2
Increasing prod: 10% +	3.60	1.28	0.289	9.3	10.2	23.0	26.5	31.1
Investing in another farming business	2.79	1.50	0.507	31.1	12.5	21.8	15.7	18.9
20%+ of the income from non-farm investments/wages	2.29	1.42	0.005	41.9	21.5	15.1	8.4	13.1
Diversifying the current business	2.15	1.38	0.000	50.0	14.0	15.4	11.9	8.7

* Standard deviation + F significance probability across regions

The options of 'diversifying the current businesses' and 'more than 20% of your income coming from non-farm investment or wages', were rated as moderately unlikely to occur in the future. These two options were notable for the high proportion (over 40%) of farmers rating these options as 1 or very unlikely. These latter two strategies were the only ones where there was a significant difference in farmer ratings between regions, though reducing farm debt has a high probability (89.8%) of difference.

Table 18 Significant regional differences for future investment and income strategies

	Overall mean	Taranaki	Waikato	Northland
20%+ of the income from non-farm investments /wages	2.29	1.95[b]	2.54[a]	2.29
Diversifying the current business	2.15	2.09[a]	1.86[b]	2.65[ab]

Table 18 shows that 'off farm investments or wages' are more likely to be a source of future income for farms in the Waikato compared to businesses in Taranaki. Figure 1 highlights this regional difference, by showing the very high proportion (77%) of Taranaki farmers rating 'off farm investments or wages' as very unlikely (1 or 2) to occur on their farms. In comparison, the proportion of farmers in the Waikato who rated this option as unlikely (1 or 2) was lower at 55%.

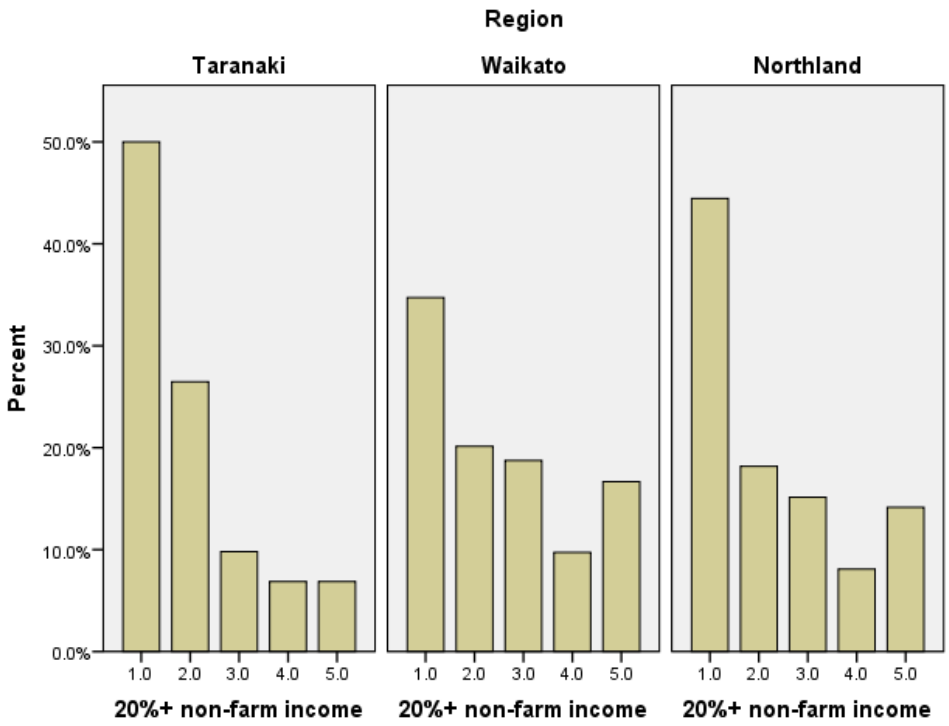

Figure 1 Likelihood of more than 20% of farm income coming from non-farm investment or wages, 1 very unlikely to 5 very likely.

Table 18 shows that farmers in Northland are significantly more likely (rating 2.65) to diversity their business than farmers in the Waikato and Taranaki, with ratings of 1.86 and 2.09 respectively. A high percentage (over 50%) of farmers are very unlikely (1) to diversity their businesses in the Waikato and Taranaki compared to respondents in Northland where there was a more even spread of ratings in as shown in Figure 2.

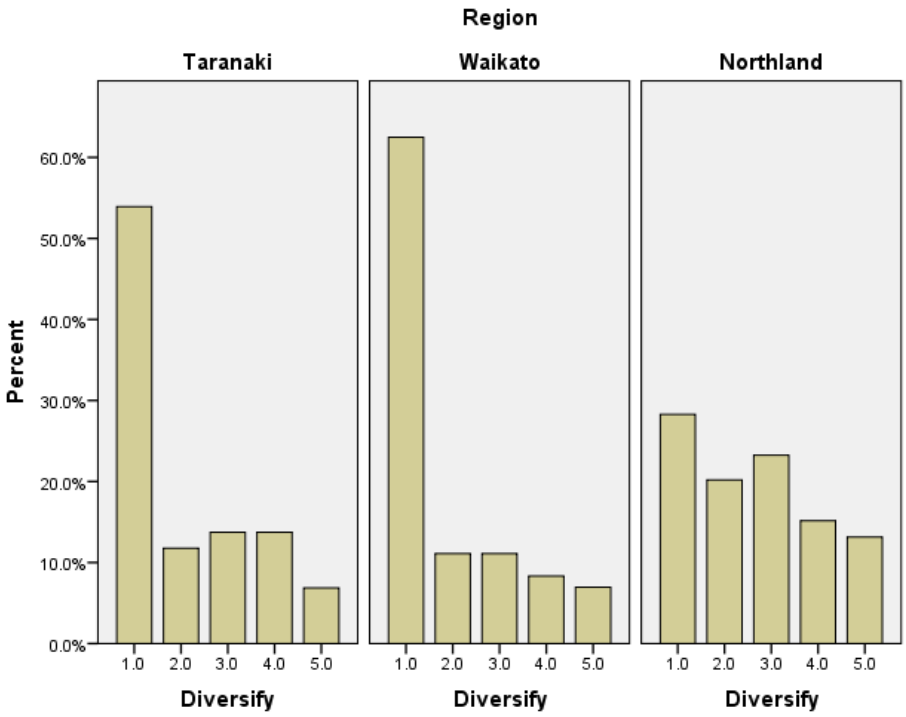

Figure 2 Likelihood of farmers diversifying their current farm business in the future, 1 very unlikely to 5 very likely.

3.5 Challenges to farmers future plans

Following asking the farmers to rate their views on future farm ownership, options for doing the farm work, and income and investment strategies, they were asked to rate how a selection of related challenging situations would affect their future farming plans. Overall, farmers rated the challenges, listed in Table 19, as somewhat of a minor challenge (overall mean rating of 3.44 to 2.02), to their future plans.

The two most challenging issues were 'environmental regulation and issues', followed by 'being able to find suitably experienced staff', with mean overall ratings of 3.44 and 3.21 respectively. The next three most challenging issues identified were all financial, being related to capital and cash returns from farming. These challenges were all rated as 'somewhat' challenging (overall mean ratings from 3.11 to 2.93), as shown in Table 19. A mixed group of issues, staff management, risk, technology and knowledge/detail of future plans were all rated as somewhat of a minor challenge with mean overall ratings from 2.76 to 2.48. The least challenging issue, from farmer rankings, was 'difficult to discuss with next generation', which was rated as a very minor challenge, with an overall mean of 2.02.

Of the ten challenges farmers were asked to rate, only two were significantly differently between regions. These two issues were 'the level of cash returns from your farm over the last 4 seasons' and 'your willingness and capability to manage staff'.

Table 19 Percentage of farmers rating of each challenge to their future farming plan(s), from 1 no challenge to 5 very challenging.

	Overall mean	**Sd***	**Sig+**	**Rating**				
				1 *No challenge*	**2** *Minor*	**3** *Some what*	**4** *moderate*	**5** *Very challenging*
Environmental regulations and issues	3.44	1.23	0.354	8.8	14.0	24.6	29.5	23.1
Being able to find suitably experienced staff	3.21	1.37	0.602	15.5	16.5	22.7	22.4	22.7
The amount of capital and/or debt needed, future	3.11	1.19	0.483	10.3	21.5	27.6	27.6	12.9
The level of cash return from your potential future plan	3.04	1.03	0.145	6.5	23.0	39.2	22.7	8.6
The level of cash returns from your farm over the last 4 seasons	2.93	1.17	0.014	14.4	18.2	38.4	18.5	10.6
Your willingness and capability to manage staff	2.76	1.26	0.012	21.5	21.5	24.8	24.2	7.9
The level of risk with your potential plan	2.74	1.06	0.410	14.1	25.0	38.5	17.6	4.7
Lack of suitable, cost effective technology	2.58	1.05	0.771	16.7	30.4	34.6	14.3	3.9
A lack of knowledge and/or detail about your future plan	2.48	1.00	0.785	18.8	31.0	37.0	10.1	3.0
Difficult to discuss with next generation	2.02	1.12	0.080	43.3	25.7	21.0	5.5	4.4

* Standard deviation + F significance probability across regions

Environmental regulations and issues was rated by farmers as the greatest challenge to their future plans. Over half of surveyed farmers (53%) rated it as moderately (4) or very challenging (5), compared to 23% who rated it as either a minor (2) or not a challenge (1). This challenge had two main aspects, as shown by the farmers' comments in Table 20. The second most challenging issue was 'being able to find suitably experienced staff'. This had an overall mean rating of 3.21, so was considered an important challenge. Like the issue of environmental regulations, a high proportion (45%) of farmers rated the issue as moderate or very challenging (4 or 5). However, in comparison with environmental regulations, a higher proportion (16%) of farmers rated the issue as no challenge (1) to their

future plans. The staff issue was around finding staff with the 'right attitude', as shown by Table 20.

The second most challenging issue was 'being able to find suitably experienced staff'. This had an overall mean rating of 3.21, so was considered an important challenge. Like the issue of environmental regulations, a high proportion (45%) of farmers rated the issue as moderate or very challenging (4 or 5). However, in comparison with environmental regulations, a higher proportion (16%) of farmers rated the issue as no challenge (1) to their future plans. The staff issue was around finding staff with the 'right attitude', as shown by comments in Table 20.

Next, three financial challenges had mean overall ratings of between 3.11 and 2.93, so were considered by farmers to be 'somewhat' challenging to their future plans. The 'amount of capital and/or debt needed for future plans' was notable for the even spread of ratings over the minor to moderate challenge ratings (3, 4 and 5). For farmers, this issue was about the amount of capital (debt) needed for their future plans, and then the ability to service that associated debt, as shown by the comments in Table 20. The 'level of cash return from your potential future plan' was notable for the high percentage (39%) of farmers who rated this as a somewhat of a challenge. As shown by the comments in Table 20, farmers note that the level of cash from future plans limits the future plans, and thus is closely aligned with the previous challenge of the amount of capital or debt needed. The final challenge in the suite of financial challenges was the issue of the 'level of cash returns from your farm over the last 4 seasons'. Like the previous issue, a high percentage (39%) of farmers rated this as a 3 or somewhat of a challenge. This was one of the two issues that was rated significantly different by farmers in different regions as discussed later in this section.

Table 20 Farmer comments relating to the challenges they have identified to the future plans, grouped into themes

Theme	Illustrative farmer comment
Regulations & compliance	"They do have a lot of rules and regulations, it's hard to keep up"
Staff	"Staff attitude to work, You can teach staff but not attitude to work" "I'm not a staff orientated person so I would probably shift to dry stock instead of employing staff"
Debt/capital	"Debt servicing is a killer" "There would be constraints to borrow more to develop more and move on to something else" "High land price in NZ means we are going to have to buy smaller or take longer to get the initial capital"
Lack land	"Lack of land for sale around us" "I'm trying to find a bigger farm, no luck" "Can't get neighbouring land so have had to go 3km down the road"
Cash-flow	"Cash flow limitations impact future goals"
Payout	"It's only becoming a challenge because of the pay-out … so it's going to slow us down and make our future plans a bit harder as we want to buy a farm"
Weather	"More continuing drought/climatic stuff is making this less possible to do"
Sucession	"Our children aren't interested in the farm presently but we are leaving things open" "No family to hand farm onto so doing best we can to set selves up for future and increase production" "Have no kids and the farm stresses impact me more than my husband"
None	"Nothing really"
Leaving dairying	"Not far off retiring but my worry is when do I retire and if I retire too early what will I do to stay healthy as I've worked on the farm all my life"
Age/health	"My age is my limitation"
Unspecified	"Unplanned goals don't help"

Farmers rated 'their willingness and capability to manage staff' and 'the level of risk with your potential plan' similarly as a moderate risk with overall ratings of 2.76 and 2.74, respectively. Farmers were fairly evenly spread over the mid-range ratings of 2, 3 and 4, whereas for the 'risk with the potential plan', a high proportion of farmers rated this a moderate (3) challenge. Farmers' comments regarding their willingness and capability centred on investigating options where staff did not have to be employed. The main comments regarding risk made by farmers were related to the weather as shown in Table 20. The second most challenging issue was 'being able to find suitably experienced staff'. This had an overall mean rating of 3.21, so was considered an important challenge. Like the issue of environmental regulations, a high proportion (45%) of farmers rated the issue as moderate or very challenging (4 or 5). However, in comparison with environmental regulations, a higher proportion (16%) of farmers rated the issue

as no challenge (1) to their future plans. The staff issue was around finding staff with the 'right attitude', as shown by comments in Table 20.

The 'lack of suitable, cost effective technology' and 'a lack of knowledge and/or detail about your future plans' were two of the least challenging issues for farmers, with a mean overall ratings of 2.58 and 2.48, respectively. Both of these issue had a high (>35%) proportion giving a no or minor challenging (1 or 2) rating for each of the issues. The difficulty of 'discussing the potential future plans with the next generation' was the lowest ranked challenge overall, with 43% of respondents rating this a 1 (no challenge) to their future plans.

Of the ten issues farmers were asked to rate in terms of the challenge they posed to their future plans, only two were rated significantly different between the regions, but as noted above, two other issues are probably importantly different. These two issues were 'the level of cash returns from your farm over the last 4 seasons' and 'your willingness and capability to manage staff', as shown in Table 19. For 'the level of cash returns from your farm over the last four seasons' farmers in Taranaki rated this as a significantly lower challenge (2.65) than farmers in Northland (3.12). Thus, previous farm financial performance in Northland was providing more of a barrier for future plans than in Taranaki. However the reverse was true when it came to rating the next greatest challenge 'your willingness and capacity to manage staff'. Northland farmers rated this as significantly less challenging (2.47) than their counterparts in Taranaki (2.97).

Table 21 Significant regional differences in farmer rankings of challenges to their future plans, from 1 no challenge to 5 very challenging

	Overall mean	Taranaki	Waikato	Northland
The level of cash returns from your farm over the last 4 seasons	2.93	2.65[1]	2.99	3.12[1]
Your willingness and capability to manage staff	2.76	2.97[1]	2.81	2.47[1]

Regional means within rows with different subscripts (numbers) are different ($P < .05$).

3.6 Extension preferences

Smaller scale farmers' preference in terms of how they would like knowledge and information provided was explored by asking them to rank the extension options listed in Table 22. Farmers have a strong preference for receiving knowledge via 'listening to expert speakers', 'one day workshops', 'discussions with other farmers' and 'listening to farmer case-studies', which were all rated close to 4, as shown in Table 22. It was notable that the farmers were neutral (mean overall rating 3.58) regarding the option of 'discussion groups meeting with the same

group of farmers'. Thus respondents had a preference for single events with a range of formats compared to a series of meetings with the same group.

Information provided either in a written format (mean overall rating 3.37) or via the internet (mean overall rating 3.17) was less preferred than the group meetings. The least preferred extension method, mildly not preferred, was 'working through 'what if' scenarios' with a rating of 2.87. There were no significant differences in the preference ratings between farmers in the different regions (though using 'what if' scenarios has important differences, as does the use of discussion groups).

Table 22 Farmers preference in terms of how they would like information and knowledge provided, where 1 is don't prefer to 5 strongly prefer.

	Overall	**Sd***	**Sig+**	**Rating**				
				1 *Don't prefer*	**2**	**3** *Neutral*	**4**	**5** *Strongly preferred*
Listening: expert speakers	4.14	0.90	0.758	1.5	4.1	13.0	41.4	39.9
One-day workshop	4.02	1.09	0.313	4.5	5.1	15.6	32.2	41.6
Discussions: other farmers	3.94	0.89	0.743	0.9	5.0	21.1	45.1	29.7
Listening: farmers case-studies	3.91	0.97	0.430	2.1	5.7	22.2	39.2	30.8
Discussion groups – meeting with the same group several times	3.58	1.19	0.146	7.7	9.5	24.4	33.4	25.0
Information: written	3.37	1.12	0.282	5.7	15.2	34.0	26.6	18.5
Information: internet	3.17	1.12	0.918	11.0	17.0	29.2	29.9	13.1
Working though 'what if scenarios' - computer	2.88	1.28	0.075	19.6	18.2	28.0	23.2	11.0

* Standard deviation + F significance probabilities between regions

4.0 Discussion

Initially, the aim was to survey members of the SMASH group that is farmers who identified with smaller scale farming by being members of the group. On closer inspection of the SMASH membership database it was found that some members had larger farms than expected. Thus the farm survey criteria was altered to include farmers with 385 cows or less. The response rate early in the survey process was low, especially in the Waikato, so the maximum number of cows farmers could milk to participate in the survey was lifted to 400 cows. In the final data set a small proportion of respondents (6.1%) milked between 350 and 385 cows. When the data was reviewed, 4.4% of the respondents were discovered to have greater than 385 cows.

4.1 Farm, business and farmer statistics

It is important to compare the sample used relative to the total population of dairy farms to, in part, ensure the sample is relatively representative of small dairy farms. Unfortunately it was not possible to isolate farms with less than 400 cows from the DairyNZ statistics (DairyNZ & LIC, 2012/13). However, the data shown in Table 23 does relate the sample data to 'all dairy' farms.

Table 23 Sample summary statistics relative to national statistics taken from the DairyNZ 2012/13 statistics

	NZ Dairy Statistics 2012/13	***Mean sample statistics***
Peak cows milked	402	240
Effect area (ha)	141	97
Production (kgMS/cow)	346	355
Production (kgMS/ha)	988	971
FTE	2.8	0.83

FTE: DairyNZ statistics refers to both employed and non-employed, whereas mean sample statistics referrers to employed labour only

As expected the sample of small farms had many less cows at the peak than the national average, but they also have 69% of the effective area which allows the production per cow to be slightly higher, but not the all-important production per hectare. Of real note is the labour productivity. It is difficult to compare the FTE data (Table 23) as the DairyNZ statistics are for all full time equivalents, both employed and non-employed, whereas the mean sample statistics is for only employed staff. When it comes to the regional differences, Table 24 makes it clear a much greater proportion of the farms are owner/operator relative to the national figures in all regions. This discrepancy could be expected given many of the sample comes from the association of mainly farm owners.

Table 24 Sample regional statistics relative to national regional statistics taken from the DairyNZ 2012/13 economic survey

	Northland		***Waikato***		***Taranaki***	
	Sample	National	Sample	National	Sample	National
Owner/operator herds (%)	76.8	59.8	72.9	47.3	71.8	43.4
50/50 sharemilker herds (%)	20.2	40.2	24.3	52.7	23.3	56.6
Peak cows	249	298	233	337	242	283
Production (kgMS/cow)	316	300	365	334	377	350
Production (kgMS/ha)	696	677	1080	954	1070	984

In regions other than the Waikato, the average peak cows are not as different as might be expected. However, in the Waikato the difference is quite marked. For production statistics, the smaller farms have both higher per cow and per hectare than the average farm in those regions, however the production differences are less pronounced between the regional average and small farm in Northland. Thus small farms have higher production levels that the average farm from DairyNZ statistics in each region. The average 0.83 employees, and the fact that 35% of the small farms do not employ any staff, indicates just how hard working farming families are, doing all of the farm work themselves.

Overall, smaller farmers' equity levels in their farm was high, with the mean equity level of 67%. Approximately 30% of farmers in each region had more than 80% equity in their businesses. This data does suggest there is some inherent resilience in many of the farms over their financial situation. It is also interesting to note about a quarter of the farmers had a financial interest in other farms, though the extent of the interest is not known.

The level of education, on average, is not high among small dairy farmers relative to the farmer population at large. While the average level of education is a 'farm cadet or certificate training' level, over 40% have secondary school education and around 20% have a tertiary degree of some sort. In the wider farm population 37% have tertiary education (Nuthall & Old, 2014).

In the current study, farmers strongly agreed with (4.46), and ranked, the goal of 'aiming for maximum sustainable cash returns' the highest followed by the goal 'it is essential to plan for reasonable holidays'. Farmers gave the lowest ranking, and were almost neutral (2.93), when responding to the goal of 'it is very important to pass on the property to family members'. The ranking of the latter goal is similar to that found by Nuthall and Old (2014) for dairy farmers from a range of farm sizes. This similarity in goal rating was despite vastly different future income or pay-outs. When the Nuthall and Old (ibid) study was conducted (June to November 2013), the cash pay-out for 2013/14 season was forecast to be

$7.82/kg MS, whereas when this study was (October to November 2014) conducted the estimated pay-out for 2014/15 had been almost halved to $5.55-5.65/kg MS for farmers supplying Fonterra (Fonterra, 2014).

An indication of farmers' wellbeing was gained through farmers' responses to the question of whether they slept well at night, or stayed awake worrying about decisions. Overall, farmers didn't stay awake worrying about decisions. It was notable that farmers in Northland stayed awake worrying significantly more than farmers' in Taranaki. This could be due to farmers in Northland finding the 'level of cash returns from the last four seasons' more of a challenge to their future plans than farmers in Taranaki. While support for all farmers is valuable, it maybe even more valued by farmers in Northland.

4.2 Next steps and longer term objectives of farm owner(s)

4.2.1 Farm ownership

The reluctance of small farmers to sell their current farm to move to a larger farm was the most notable feature of farmers' future land ownership plans. This echoes research in the 1990's, where over 60% of the survey respondents said they were very unlikely to sell their current property to move to a larger farm (Parker et al., 2000). This reluctance to move could be due to farmers very high level of satisfaction with their current farms' location (Parker et al., 2000), or a reluctance to move away from friends and family and their current local community (Westbrooke, 2013a). In addition, Westbrooke (2013b) reported that smaller farmers were concerned that a larger farm in a different location may not produce the same cash-flow or profit as their current farm.

If the majority of farmers are very unlikely to sell and move to a larger farm, the other options were to sell the farm or increase the size of the current farm. Both of these options were very unpopular with respondents. Increasing the size of the current farm was the most likely future option besides selling the farm outright. Historically, the availability of suitable land has been a major barrier (Parker et al., 2000), and farmers in the current study also noted this (Table 20).

The amount of capital and or debt required for future plans was also noted as a major challenge to future plans, and this would include land purchase. A previous study found that many small farmers had added small parcels of land to the home farm as they became available, but farmers were cautious about investing in neighbouring land, considering the return on the investment (Westbrooke, 2013a).

With regards to succession, the results in this report agree with earlier findings (Parker et al., 2000) where only a quarter (24%) of farmers thought it likely, or very likely, that the farm would be transferred to family members within 10 years.

Within the general farming population the proportion of farmers planning to transfer the farm to family members is higher at just over a third (Nuthall & Old, 2014). A key consideration identified by Westbrooke (2013a) was whether the smaller farming business could support two families of the farmer and a successor. Another consideration was the potential successors. Some farmers noted that their children were too young to take over the farm in 10 years. Another aspect is the number of children each family has. This question was not asked in the telephone survey, but Nuthall and Old (2014), collected this information, from their survey dairy farms supporting two or less FTE's, 28% had no children, 3% one child, 22% had 2 children with 32% having 3 children, 11% with four and 4% with greater than 4 children. This covered all ages. The overall mean was 2.05 children. Thus succession could be very unlikely for a third of smaller farmers due to the lack of a potential heir. Overall farmers were neutral regarding the importance of passing the farm to the next generation, despite the importance of succession (Potter & Lobley, 1996). This neutrality could be a realistic reaction to the lack of heirs and the difficulty of their farm supporting more than one family.

Communication within families has been identified as a major barrier to successful succession (Dooley & McLeod, 2012). In this study, only a small proportion of farmers were likely to transfer the farm to the next generation in the next 10 years, so for this sub-group of farmers, intergenerational communication may well be a serious barrier to succession. On average, however, for the population of small farmers surveyed, their view of discussions with the next generation did not emerge as one of the major challenges to their future plans.

The key message from this work with regards to succession is that small farmers overall are neutral with regards to the importance of handing on their farm to the next generation, and a high proportion, for various reasons, regard succession as very unlikely within the next 10 years. In terms of 'succession targets' information needs to be carefully targeted to those farmers likely to undertake succession at that particular point in time. There is also a high proportion of small farm owners who are unlikely to transfer their farm to the next generation, and providing support and knowledge for these farmers is just as important for those who are more likely to undertake succession.

4.2.2 Who is likely to do the work?

Staffing has emerged as a key issue for owners of smaller farms. In all regions over half (56%) of the farmers felt it likely, or very likely, that they would employ a non-family worker in the future. This contrasts with the 1990's, when just 24% of those surveyed thought they would have an employee/contractor in the future (Parker et al., 2000). Given the high proportion of farmers likely to be employing staff in the future, and that the farmers rated 'finding suitable staff' as the second highest challenge, employment is a key issue for the future plans of small farm

owners. Smaller farmers noted it was the supply (being able to find suitably experienced staff, mean rating 3.2), rather than their ability and willingness to manage staff (mean overall rating of 2.76) that was the more challenging issue. Meeting farmers' expectations with regards to staff suitability is a particularly difficult issue.

Staff employment has been identified as a key issue for the dairy industry as a whole (Clark, Caradus, Monaghan, Sharp, & Thorrold, 2007), and DairyNZ already has a program designed to attract people into the dairy industry (DairyNZ, n.d) and has developed a wealth of information and support material on its website (DairyNZ). However, smaller farmers were neutral (3.17) with regards to their preference of receiving information via the internet, or in a written form. The challenge is putting this information into the format preferred by smaller farmers, with the written, on-line material, albeit it in the right form, potentially providing an invaluable resource.

Even with a high proportion of smaller farmers planning to employ staff, approximately a third thought it moderately to very likely that they would carry out the majority of the farm work themselves. Notably more farmers in Taranaki fell into this category. This is one area where extension support could be tailored specifically to regional needs. It is tempting to infer from these results that more investment and research into labour saving technology is needed, especially for farmers not planning to employ staff. However, overall, when asked if the 'lack of suitable cost effective technology' was a challenge to their future plans, farmers were very 'neutral' about investing in on-farm technology. It could be that there is no current on-farm technology that fits the needs of small farm owners. The cost effectiveness of any on-farm technology is critical. One of the farmers with whom the questionnaire was trialled emphasised the importance of including the term 'cost effective' in the question. Much on-farm technology requires considerable capital investment and thus is suited to larger scale businesses which have the ability to spread the fixed cost over more production. Perhaps, on-farm technology should be specifically developed to meet the needs of smaller dairy farms. Caution and research is needed with any future technology to ensure it meets smaller scale farmer's needs, given that this challenge was noted as neutral overall by farmer with regards to their future plans.

4.2.3 Likely future investments and income sources

Reducing debt was the most likely future investment strategy for smaller farmers in all regions, and historically has been a very important investment strategy (Parker et al., 2000). Overall equity levels of farmers interviewed was very high, and it can be argued that repaying debt is a very conservative, low risk strategy. This could be part of a wider plan whereby once debt is at a low level or zero, funds previously used for debt servicing could be used to pay staff (Westbrooke,

2013a). Age could also be influencing a debt repayment/high equity strategy. The majority (over 70%) of farmers were over 40 years of age and thus would have witnessed the effect of the 1980's agricultural down turn. It is possible that these farmers' may prefer a low risk strategy. The low risk debt repayment strategy could also be part of the reason why farmers mildly disagreed with the statement that they 'don't sleep at night worrying about decisions made'. Increasing production by more than 10% was rated similarly as repaying debt, and farmers were neutral about the option of investing in another farming business.

The least likely investment strategies were where the interesting variations between the regions occurred. Farmers in Taranaki were significantly less likely to have more than 20% of their future income coming from non-farming sources relative to farmers in the Waikato. Farmers in Northland were significantly more likely to diversity their businesses that the farmers in the other regions. Diversification requires both time and opportunity to be successful (McNally, 2001). Northland had a higher overall mean level of staff employed and a higher proportion of farmers employing two or more staff. This reflects the larger farms but may also provide capacity for diversification. Perhaps it is Northland's wonderful coastline attracting holidaymakers that is providing the opportunity that farmers are thinking of for the future.

4.3 Challenges to farmers future plans

Environmental regulations and compliance was ranked by farmers, in all regions, as the greatest challenge to their future plans. This issue was also identified by farmers in the 1990's as a barrier to lifting farm income (Parker et al., 2000). The level of challenge was rated as moderate by farmers in both the current and earlier study. From the farmer comments there are two aspects to this challenge. First, keeping up to date with regulatory and compliance issues. In this regard, farmers indicated that they valued SMASH events for keeping them up to date, and SMASH should keep providing this service. The second aspect was the capital and on-going cost of compliance. Due to lower total production per farm, the cost of capital per kilo of milk solids is higher than for larger scale farms. SMASH's role could be to actively research and encourage cost effective ways for small farm owners to meet compliance requirements. This could range from a specific workshop where farmers and experts can share ideas, to a meeting where a group of farmers could meet with a consultant to complete requirements such as a Health and Safety plan for their farms. Working as a small group would spread the cost of a consultant or expert, yet give small herd owners efficient access to the knowledge and information required.

4.4 Farmers' preferences for extension systems

There was strong support for the current SMASH format of one day workshops with speakers. This support was evident from the individual farmers' comments,

and the overall ratings, 'listening to expert speakers', 'one day workshops' , 'discussions with other farmers and 'listening to farmers case studies' which all had mean overall scores near 4, or strongly preferred. The farmers surveyed were largely from the SMASH databases, so this support indicates that the organisation is meeting the extension preferences of its target group of farmers.

It was evident from the comments that individual farmers also highly valued the support gained from attending SMASH meetings. Yet it was notable that 'discussion groups', 'meeting with the same group several times', was only moderately preferred as an extension method by respondents. One reason for the lower ranking is that support can be obtained from irregular meetings without the commitment and social energy required to attend more regular meetings. If SMASH considered running 'regular discussion groups' care should be taken to ensure that there is sufficient long term energy and support for this extension method.

Providing information in either a written form, or via the internet, is a passive way of providing information to farmers, with little chance of farmers interacting with others to integrate the information for their own situation. This extension method was mildly preferred by farmers, and would be most useful in providing background, or more detailed information to support issues covered at meetings. There is a wealth of information on issues, such as succession, available on the internet e.g. www.onefarm.ac.nz. When SMASH is addressing an issue, the material available on the internet could be reviewed and made available to farmers to coincide with specific meetings or workshops.

5.0 Conclusions and recommendations

Wellbeing is "a dynamic process that gives people a sense of how their lives are evolving" (Nimpagariste & Culver, 2010). This study aimed to provide recommendations to enhance the wellbeing of smaller dairy farmers by understanding their goals, future plans and challenges.

Four key issues for smaller farmers' were highlighted in this research. Firstly, the low level of succession planned for the next ten years. Thus a high proportion of smaller farmers' need strategies that meet their financial and lifestyle objectives independent of a successor. The second key issue was the employment of staff in the future. Two distinct groups emerged, the majority who planned to employ staff and the minority who did not. These two groups will need different knowledge and support for their wellbeing in the future. The third key issue was the challenge of 'environmental regulations and issues'. This is a well-recognised challenge for the whole dairy industry, however smaller dairy farmers may require practices and support tailored to their specific needs. The final key issue was the equity/cash-flow trade off. Smaller farmers have, on average, a high equity level in their businesses, yet their main investment strategy is to repay more debt. However, the fourth ranked challenge was the lack of capital for their future plans, the 'scale condrum'.

Interestingly, there were no significant differences between regions for the key issues. Due to the lack of regional differences, generic extension knowledge and support can be developed specifically for smaller farmers, but should be contextualised for specific farmers groups or environments rather than regions.

Generally smaller farmers didn't stay awake at night worrying about decisions made, perhaps an indication of their overall wellbeing when the study was conducted. This is just one indicator of wellbeing and addressing issues highlighted in this report would enhance smaller farmers' wellbeing in the future.

5.1 Recommendations

1) Succession

a) Research and develop a range of options to meet the needs of the majority of smaller farmers who do not plan to transfer the farm to one or more children. The range of options would need to suit farmers at different stages in their careers. These strategies could include options for farmers who want to employ staff and those who do not, and recognise the capital/cash-flow, workload and environmental implications. This could also include a business model for farmers in c) below.

b) A whole farm systems modelling (such as GSL or Farmax in combination with Overseer) approach could be used to assess the financial and environmental aspects of options for a) above. The models should be developed with farmers to ensure that the risks and 'the human' side are investigated. The whole farm models could then be used to start the conversation about which options may suit farmers in different situations at workshops/seminars. Whole farm models could also be developed for situations where farmers have identified a potential successor for their business and are investigating transfer options.
c) Investigate matching farmers who are very likely to sell, with those who are very likely to increase their farm size. The farmers could enter into a business relationship where one farm is gradually transitioned into the other. This transition phase would allow both parties to make plans and investment decisions, together with more certainty over a longer time frame. Risks and exit clauses/strategies would need to be carefully considered. Potential business structures and agreements would need to be researched and developed.
d) Develop a farmer succession network. Identify farmers who have recently been though succession, and are willing to be guides. They would be listed as 'guides /mentors' for other farmers within the farming community. They would not be asked to act as formal advisors, but rather, through their own experience, offer guidance and mentoring to other farmers through being 'sound and valuable' sources of information.

2) **Regulatory or compliance issues**

a) Investigate and develop a suite of cost-effective options specifically for smaller farmers to meet environmental regulations. The suite of options could include systems to meet nitrogen leaching requirements, or infrastructure with lower capital investment to meet effluent management requirements. The emphasis is on providing small farmers with a range of options to choose from using Farm System Models such as GSL and Farmax in combination with Overseer.
b) Put together compliance requirements from a range of areas (e.g. health and safety, effluent management) in one place in a format that is easily accessible by those who may use them infrequently, i.e. smaller SMASH farmers.
c) Continue to provide, via SMASH, timely workshops where farmers can access and discuss quality information to keep abreast with compliance issues, for example employment or environmental regulations.
d) Consider running workshops where farmers can complete compliance requirements 'sharing the cost' of a consultant or expert and with the support of other farmers in the group.

3) **Staff**

a) Identify the frequency and which specific pieces of staff management information smaller scale farmers use, then develop a way of providing this "sifted" information at the right time. DairyNZ has a valuable wealth of information and skills in this area, and the challenge is tailoring this to the needs of farmers with less than two staff members.
b) Convene an Employment Summit with OneFarm to bring together rural professionals and farmers to determine developments in employment relations that would be valuable for farmers employing two or less staff. Participants at the summit could also then discuss how these developments are best relayed to smaller farmers with staff, and if appropriate, implemented on farm.

4) **Technology**

a) Encourage the development of cost effective technology (or systems), specifically for smaller farms to reduce the workload and make farming easier and more enjoyable. A competition could be run with attractive prizes, with a section for farmers and another for commercial companies. The winners would be decided by smaller farmer votes, which would also raise farmer awareness of the technology/systems. Cost effective technology could include the development of Apps or cloud technology that can be accessed via mobile devices, as well as on-farm time saving devices.

5) **Cash-flow/Profitability**

a) Include a new category of 'scale' in the DairyNZ Economic Survey. With scale, the aim would be to separate smaller family farms with no staff, or very few staff, from medium and larger scale operations. This would allow researchers, commentators and farmers who choose not to complete DairyBase to see the effects of scale on a range of financial and farm system parameters.
b) Encourage more SMASH farmers to participate in Dairybase. More data will result in the better and more informed farm business management decisions for all SMASH farmers and their advisors.
c) More Farm Business Management research/modelling is required to fully examine the suitability, risk and resilience for SMASH farmers of farm systems that include de-intensification, de-stocking, diversification based on Land Use Categories (LUC) and OAD Milking that result in less on-farm labour, good environmental outcomes and profit. This research would link with that in 2a, above.

DairyNZ, OneFarm, consultants and rural professionals could be invited to work together, collaboratively, with SMASH farmers to conduct the research, develop the farm systems models and design an extension program incorporating the above points.

6.0 References

Allen, J. (1998). The viability of small dairy farms. Primary Industries Management, 1(3), 26-28.

Botha, N., & White, T. (2013). Distress and burnout among NZ dairy farmers: research findings and policy recommendations. Extension Farming Systems Journal, 9(1 Research Forum), 160-170.

Breustedt, G., & Glauben, T. (2007). Driving Forces behind Exiting from Farming in Western Europe. Journal of Agricultural Economics, 58(1), 115-127. doi:10.1111/j.1477-9552.2007.00082.x

Burton, R. J. F., & Walford, N. (2005). Multiple succession and land division on family farms in the South East of England: A counterbalance to agricultural concentration? Journal of Rural Studies, 21(3), 335-347. doi:http://dx.doi.org/10.1016/j.jrurstud.2005.04.004

Clark, D. A., Caradus, J. R., Monaghan, R. M., Sharp, P., & Thorrold, B. S. (2007). Issues and options for future dairy farming in New Zealand. New Zealand Journal of Agricultural Research, 50(2), 203-221. doi:10.1080/00288230709510291

DairyNZ. People. Retrieved from http://www.dairynz.co.nz/people/

DairyNZ. (n.d). Dairy Careers. Retrieved from http://www.dairynz.co.nz/what-we-do/careers/

DairyNZ, & LIC. (2012/13). Dairy Statistics. Retrieved from http://www.lic.co.nz/lic_Publications.cfm

Defrancesco, E., Gatto, P., Runge, F., & Trestini, S. (2008). Factors Affecting Farmers' Participation in Agri-environmental Measures: A Northern Italian Perspective. Journal of Agricultural Economics, 59(1), 114-131. doi:10.1111/j.1477-9552.2007.00134.x

Diener, E., Oishi, S., & Lucas, R. E. (2003). Personality, Culture, and Subjective Wellbeing: Emotional and Cognitive Evaluations of Life. Annual Review of Psychology, 54(1), 403-425. doi:doi:10.1146/annurev.psych.54.101601.145056

Dooley, E., & McLeod, M. (2012). Dairy Farm Succession - information evaluation. Retrieved from ONEFarm: http://www.onefarm.ac.nz/research/completed-research/dairy-farm-succession-information-evaluation/

Fonterra. (2014). Fonterra revises 2014/15 forecast milk price and dividend. Fonterra.com.

Franz, N., Piercy, F., Donaldson, J., & Richard, R. (2010). How farmers learn: implications for agricultural educators. Journal of Rural Social Sciences, 25(1), 37-59.

Greig, B. (2012). Changing NZ dairy farm systems. Paper presented at the South Island Dairying Event, Dunedin, New Zealand.

Hansson, H., Ferguson, R., & Olofsson, C. (2012). Psychological Constructs Underlying Farmers' Decisions to Diversify or Specialise their Businesses – An Application of Theory of Planned Behaviour. Journal of Agricultural Economics, 63(2), 465-482. doi:10.1111/j.1477-9552.2012.00344.x

Lambert, D. M., Sullivan, P., Claassen, R., & Foreman, L. (2007). Profiles of US farm households adopting conservation-compatible practices. Land Use Policy, 24(1), 72-88. doi:http://dx.doi.org/10.1016/j.landusepol.2005.12.002

McNally, S. (2001). Farm diversification in England and Wales — what can we learn from the farm business survey? Journal of Rural Studies, 17(2), 247-257. doi:http://dx.doi.org/10.1016/S0743-0167(00)00050-4

Molnar, J. J. (1985). Determinants of subjective wellbeing among farm operators: characteristics of the individual and the firm. Rural Sociology, 50(2), 141-162.

Nimpagariste, F., & Culver, D. (2010). A broader perspective of measuring the wellbeing of rural farm and non-farm households Retrieved from http://www.fao.org/fileadmin/templates/ess/pages/rural/wye_city_group/2010/May/WYE_2010.1.2_Culver.pdf

Nuthall, P. L. (2006). Determining the important management skill competencies: The case of family farm business in New Zealand. Agricultural Systems, 88(2–3), 429-450. doi:http://dx.doi.org/10.1016/j.agsy.2005.06.022

Nuthall, P. L., & Old, K. M. (2014). Report on a succession and governance survey of a random stratified sample of NZ farmers. Retrieved from Christchurch, New Zealand:

Pangborn, M. (2012). Growth and innovation in the Canterbury dairy industry. (PhD), Lincoln University, Christchurch, New Zealand.

Parker, W. J., Rauniyar, G. P., & Dooley, A. E. (2000). The future for the small dairy farm: plans, priorities and constraints. Proceedings of the New Zealand Society of Animal Production, 60, 241-246.

Potter, C., & Lobley, M. (1996). Unbroken Threads? Succession and its Effects on Family Farms in Britain. Sociologia Ruralis, 36(3), 286-306. doi:10.1111/j.1467-9523.1996.tb00023.x

Ryan, R. M., & Deci, E. L. (2001). On Happiness and Human Potentials: A Review of Research on Hedonic and Eudaimonic Wellbeing. Annual Review of Psychology, 52(1), 141-166. doi:doi:10.1146/annurev.psych.52.1.141

Sankey, S. (2015). Using the whole farm assessment process to improve New Zealand dairy discussion groups. Rural Extension and Innovation Systems Journal, 11(1 Practice), 197-203.

Santelmann, M. V., White, D., Freemark, K., Nassauer, J. I., Eilers, J. M., Vaché, K. B., Debinski, D. (2004). Assessing alternative futures for agriculture in Iowa, U.S.A. Landscape Ecology, 19(4), 357-374. doi:10.1023/B:LAND.0000030459.43445.19

Sewell, A. M., Gray, D. I., Blair, H. T., Kemp, P. D., Kenyon, P. R., Morris, S. T., & Wood, B. A. (2014). Hatching new ideas about herb pastures: Learning together in a community of New Zealand farmers and agricultural scientists. Agricultural Systems, 125, 63-73. doi:http://dx.doi.org/10.1016/j.agsy.2013.12.002

Shadbolt, N. M. (2012). Competitive strategy analysis of NZ pastoral dairy farming systems. International Journal of Agricultural Management, 1(3), 19-27. Retrieved from http://www.ingentaconnect.com/content/iagrm/ijam/2012/00000001/00000003/art00004

Summer, D. A., & Wolf, C. A. (2002). Diversification, Vertical Integration, and the Regional Pattern of Dairy Farm Size. Review of Agricultural Economics, 24(2), 442-457. doi:10.1111/1467-9353.00030

Westbrooke, V. (2013a). Business options and strategies: a study of small herd owners views in the Waikato, New Zealand. Extension Farming Systems Journal, 9, 60-66.

Westbrooke, V. (2013b). Future Farm Management Options for Smaller Dairy Farms. Retrieved from http://www.onefarm.ac.nz/research/completed-research/future-farm-management-options-for-smaller-dairy-farms/

7.0 Appendix: Survey questionnaire

Note the space for the comments section has been reduced, to reduce the space used in this report.

Questionnaire for the telephone interviews of small dairy farms

Hello, I'm <name> ringing on behalf of SMASH, the farmer led smaller herds group.

You are invited to participate in a project that aims to find out where smaller dairy farmers would like their businesses to be in 10 years and information and tools that would help you get there.

The work is funded by SMASH and DairyNZ, and your phone number was selected from the SMASH database, or the electoral roll.

We know your time is valuable, so we will randomly select three farmers to receive a $200 Farmlands voucher. Your responses would be kept strictly confidential, and non-identifiable.

Would you have 10-12 minutes to help us?

The results will be published on the SMASH, DairyNZ and OneFarm websites.

Your participation is voluntary and you are welcome to withdraw by the 14th of December 2014 and your information will be destroyed. If you have any concerns, or would like to withdraw after you have completed the survey please contact Victoria Westbrooke a Lecturer at Lincoln University, on 03423 0272. This research has been reviewed and approved by the Lincoln University Human Ethics Committee.

If yes Is now a good time to talk? If not when could we ring back over the next couple of days?

1) Firstly, some background information on your farm

(last season refers to 2013/14)

a) Are you a land owner/sharemilker/manager or farm staff? *<if staff or a manager please explain we were wanting to talk with owners and 50-50 sharemilkers, thank them for their time>*	
b) What's the effective area of your farm?	
c) What was the peak number of cows that you milked last season? *<if over 350 cows please explain wanting to talk with farmers with less than 350 cows and thank them for their time>*	
d) How many kgs of milksolids did the farm produce last season?	
e) Did you employ any staff last season? If so how many?	
f) Have you increased your herd size by at least a third since your first season (Y/N)?	

2) So …. Thinking ahead 10 years, could you please rate how likely these future options are to happen, using the scale 1, very unlikely to 5 very likely,

What is the likelihood of you…

(if the participant is a non-land owner, please don't ask the shaded questions)

	V. Unlike		Neutral		V. likely	Already doing
a) Selling the farm within 10 years	1	2	3	4	5	
b) Selling the home farm and moving to a larger farm?	1	2	3	4	5	
c) Increasing the size of the current farm e.g. by purchasing adjoining land	1	2	3	4	5	
d) The farm being transferred to 1 or more children	1	2	3	4	5	
e) Employing a non-family worker/sharemilker	1	2	3	4	5	
f) Doing the majority of the work	1	2	3	4	5	
g) Investing in on-farm technology to do farm work e.g. automatic cup removers, robots	1	2	3	4	5	
h) Increasing production by more than 10%	1	2	3	4	5	
i) Diversifying the current business e.g. into dry stock, tourism	1	2	3	4	5	
j) Investing in another farming business, as well as the current farm?	1	2	3	4	5	
k) More than 20% of your income coming from non-farm investments or wages?	1	2	3	4	5	
l) Reducing the farm debt to very low levels?	1	2	3	4	5	

3) Thinking about your most likely farming plans that we have just discussed, could you please rate the level of the following challenges?….using the scale of 1 no challenge to 5 very challenging ….

How much of a challenge is….

	None				V. chal
a) The level of cash returns from your farm over the last 4 seasons	1	2	3	4	5
b) The level of cash return from your potential future plan	1	2	3	4	5
c) The amount of capital and/or debt needed for your possible future plan	1	2	3	4	5
d) The level of risk with your potential plan	1	2	3	4	5
e) A lack of knowledge and/or detail about your future plan	1	2	3	4	5
f) Environmental regulations and issues	1	2	3	4	5
g) Lack of suitable, cost effective technology	1	2	3	4	5
h) The difficulty of discussing the potential future plan with the next generation	1	2	3	4	5
i) Being able to find suitably experienced staff	1	2	3	4	5
j) Your willingness and capability to manage staff	1	2	3	4	5

4) With regards to <*the highest ranked challenge*>, could you describe in more detail how this could affect your possible future plan(s)

5) Thinking about your management, could you please rate the following statements on a 5 point scale where 1 is strongly disagree, to 5 strongly agree

	S. Disagree				S. Agree
a) You tend to tolerate mistakes and accidents that occur with employees and/or contractors	1	2	3	4	5
b) You sometimes don't sleep at night worrying about decisions made.	1	2	3	4	5
c) You find investigating new farming methods exhilarating and challenging	1	2	3	4	5
d) You normally don't rest until the job is fully completed	1	2	3	4	5
e) You speak your mind and ask questions at farmer meetings.	1	2	3	4	5
f) It is very important to pass on the property to family members	1	2	3	4	5
g) It is essential to plan for reasonable holidays and leisure time	1	2	3	4	5
h) When things go wrong it is often due to events beyond my control, e.g. weather, product prices	1	2	3	4	5
i) Aiming for maximum sustainable net cash returns is very important	1	2	3	4	5

6) What topics or tools could SMASH provide to help you with your 10 year plan?

<*Write Topic/tools, could be more than two…*>	Could you describe the <topic> tool in more detail? <*we are looking for aspects or details that could be provided covered at workshops etc*>

a) Thinking about how you would like the information and tools provided, could you please rate the following options on a 1-5 scale where 1 is 'no preference' and 5 a 'high preference' for the option.

	Don't prefer		Neutral		S. Prefer
a) One-day workshop	1	2	3	4	5
b) Discussion groups – meeting with the same group several times	1	2	3	4	5
c) Listening to expert speakers	1	2	3	4	5
d) Listening to farmers – case-studies	1	2	3	4	5
e) Information provided in a written booklet	1	2	3	4	5
f) Information provided on the internet	1	2	3	4	5
g) Discussing the topic with other farmers	1	2	3	4	5
h) Working though 'what if scenarios' through a computer model	1	2	3	4	5

7) The final section is some general information on yourself and the business

a) With regards to your age, what decade are you in?	20-30	30-40	40-50	50-60	60+
b) Were you born and bred in a rural area?	Yes	No			
c) What is your highest level of education?	Secondary	Farm cadet /certificate	Diploma	Degree+	other
d) Do you have any **non**-farming businesses/investments?	Yes	No			
e) Do you have financial interests in other farming businesses as well as the home farm?	Yes	No			
f) What % of equity do you have in your farming business	%	Prefer not to answer			

Equity is the proportion of the business owned by the farmer, i.e. not debt

2) Any other comments on your future plans or how SMASH could help?

Please thank the participant for their time and input
End of interview

Gender of participant: Male / Female
Region: Northland /Waikato / Taranaki
Survey code _____

Additional information if needed…
Mental Health services for farmers: Rural Support ph 0800 787 254

Smaller scale New Zealand dairy farmers: long term plans and key challenges

Westbrooke, Victoria

2016